



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/778,589	02/07/2001	Ali S. Khayrallah	4015-891	4636
24112	7590	06/21/2005	EXAMINER	
COATS & BENNETT, PLLC			CHANG, EDITH M	
P O BOX 5			ART UNIT	
RALEIGH, NC 27602			PAPER NUMBER	
			2637	

DATE MAILED: 06/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/778,589

Applicant(s)

KHAYRALLAH, ALI S.

Examiner

Edith M. Chang

Art Unit

2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,5-13,15,18-25,29-40 and 43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5-13,15,18-25,29-40,43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Arguments/Remarks*

1. Applicant's arguments with respect to claims 1, 13, 25 and 36 have been considered but are moot in view of the new ground(s) of rejection.

### *Drawings*

2. Figure 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121 (d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance. According to the brief description of the drawings on page 3 and the description on page 6 lines 12-18, and on page 8 lines 1-5, the Figure 1 and 2 are conventional systems.

### *Claim Objections*

3. Claims 15 and 30 are objected to because of the following informalities:  
Claim 15, line 1: "The method of claim 14" should be "The method of claim 13".  
Claim 30, line 1: "The method of claim 29" should be "The apparatus of claim 29".  
Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U. S. C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 37-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 37, "the apparatus of claim 36 further comprising a demodulator" does not clearly indicate the structure of the apparatus (shown in FIGA) which including an equalizer, in turns the equalizer can be replaced by a demodulator and differential decoder (as stated in specification page 11 lines 4-5, FIG. 1 and FIG. 2). The apparatus of claim 36 comprises an equalizer as shown in FIGA, and addition to the equalizer (further) comprises de-interleaver, channel decoder, re-encoder, and source decoder.

Claims 38-40 are dependent on the rejected claim 37.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 5-10, 12, 25, 29-33 and 35 are rejected under 35 U. S.C. 103(a) as being

unpatentable over Seshadri et al. (US 5,289,501) in view of Ho et al. (US 6,072,770).

Regarding **claims 1 & 25**, in FIG. 1, Seshadri et al. teaches a transmitter of code modulation with unequal error protection. The multi-level encoder 120 (channel coder) provides an encoded sequence 121 to the modulator 151 (the input of 151 as the input sequence), in turns to provide a transmit sequence transmitted over antenna 152 based on the sequences 121 with different coding classes (less or more protected, column 4 lines 12-19); and a DPSK modulation (131 & 152, column 4 line 66-column 5 line 10) to broadcast the transmit sequence via antenna 152 (column 4 lines 59-63).

However Seshadre et al. does not explicitly show the detail of the well-known DPSK modulation, Ho et al. teaches the MPSK Modulation technique in FIG. 1 (column 3 lines 45-61) that the coded information bits  $\sim(n)$  are differentially coded with respect to information bits of previous symbols  $\sim(n-1)$  (Dif Encoder 12 of FIG. 1). At the time of the invention was made, it would have been obvious to one of ordinary skill in the art to implement the basic elements of the MPSK (MPSK Mapper, DifEncoder, MPSK Modulator) taught by Ho et al. in Seshadri et al.'s DPSK transmitter (Constellation Mapper and Modulator) that the different protections bit(s) (one or more bits) of a symbol in the sequence 121 is differentially coded. The combination/modification gains the benefit of a simple mechanism for demodulating and separating individual signals transmitted on the fading channels (CDMA channels, column 2 lines 61-64 '770).

Regarding **claims 5-6 & 29-30**, the combined/modified Seshadri et al.'s transmitter with Ho et al.'s teaching discloses the information bits of previous symbols comprising at least one

unprotected bit and other combinations (column 13 lines I-11, wherein the combination of different codes can include one code of "no coding" i. e. unprotected '501).

Regarding **claims 7-10 & 31-33**, in FIG. 1, Seshadri et al, teaches the input sequence (input of modulator 151) comprising the multi-level encoding bits (from 121) with different error coding of an unequal error protection scheme (column 3 lines 62-67 & column 4 lines 12-19) based on the sequence from the speech signal source 101 to produce a coded sequence (out put of 141 interleaver).

Regarding claims 12 & 35, in FIG. 1, Seshadri et al. teaches modulating a carrier with the transmit sequence to provide a transmit signal transmitted over the antenna 152 (column 1 lines 6-12).

8. Claims 1 I and 34 are rejected under 35 U. S. C. 103(a) as being unpatentable over Seshadri et al. (US 5,289,501) in view of Ho et al. (US 6,072,770) as applied to claims 1 and 25 above, and further in view of Lee et al. (US 6,289,486).

Regarding **claims 11 & 34**, Seshadri et al. does not specify the type of interleaver, however Lee et al. teaches the diagonal interleaver in FIG. 5. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the diagonal interleaver taught by Lee et al. in Seshadri et al.'s interleaver for the purpose of providing a flexible system to interleaving the input data regardless the frame size (column 2 line 60-67 '486).

9. Claims 13, 15, 18-24, 36-40 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seshadri et al. (US 5,289,501) in view of Ho et al. (US 6,072,770) and Khaled et al. (US 5,416,804).

Regarding **claims 13, 20, 36-37 & 40**, in FIG.2, Seshadri et al. teaches a receiver with a front end processing 211 including a demodulator for demodulation and an equalizer for equalization (column 12 lines 15-24) the received signal from antenna 201; and a multi-level decoder 231 (as the channel decoder) decoding bits of unequal error protections (column 12 lines 28-31). However Seshadri et al. does not explicitly show the detail of the well-known DPSK demodulation, Ho et al. teaches the MPSK demodulation technique in FIG.2. At the time of the invention was made, it would have been obvious to one of ordinary skill in the art to implement the basic elements of the demodulation of MPSK (Noncoherent Qua. Demodulator 21, Dif.decoder 25 & 27, column 4 lines 21-24, lines 34-40) taught by Ho et al. in Seshadri et al.'s DPSK receiver (211 implemented with the demodulator 21, and Difdecoder 25& 27 of Ho) that the different protections bit(s) (one or more bits) of a symbol in the received sequence (input of 231 '501) is differentially decoded with respect to bits of a previous received symbol; and

Seshadri et al. does not specify the re-encoder of a multi-pass demodulator, in FIG.4/FIG.5, Khaled et al. teaches the re-encoder (461) of a multistage decoder having two error protection stages (column 5 lines 67-68), wherein the re-encoded bits (as the pilot bits) are fed back from the decoder 451 (INT) and the decoder 441 (EXT) to the detector 402 (the modulator, the second path). At the time of the invention was made, it would have been obvious to one of ordinary skill in the art to implement the re-encoders taught by Khaled et al. (FIGA '804) in the multi-level decoder (231 FIG.2 '501) to produce k; to the speech decoder (253) for the purpose

of improving the performance of decoding and maintaining the simplicity of the decoder (column 3 lines 50-56).

Regarding **claims 15 & 38**, the combined/modified Seshadri et al.'s receiver discloses the front end processing 211 and multi-level decoder (as the equalizer) to perform demodulating and differential decoding.

Regarding claims 18-19 & 39, the combined/modified Seshadri et al.'s receiver discloses outputting the re-encoded bits from the re-encoder (from 46s FIGA '804) from the multi-level decoder (the channel decoders of 44s and 45s).

Regarding **claims 21-24 & 43**, the combined/modified Seshadri et al.'s transmitter with Ho et al.'s teaching discloses the information bits of previous symbols comprising at least one unprotected bit and other combination (column 13 lines I-11, wherein the combination of different codes can include one code of "no coding" i.e. unprotected).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M. Chang whose telephone number is 571-272-3041. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayanti Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished




Art Unit: 2637

applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edith Chang

June 2, 2005

  
**BETSY L. DEPPE**  
**PRIMARY EXAMINER**